

## Chirag Gupta, Ph.D.

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### SUMMARY

Bioinformatics Scientist with 8+ years of experience in data-driven scientific investigations of human and plant systems. My objective is to develop bioinformatics solutions for integrating multi-omics data and applications of advanced machine learning techniques to guide clinical decision making and design efficacious wet lab experiments. I have extensive experience in written and oral communication to academics and business leaders through contributions to winning grants, 10+ peer reviewed publications, 4+ oral and 10+ poster presentations.

### EDUCATION

2017	<b>Ph.D. Cell and Molecular Biology (Computational)</b> Dissertation: Transcriptome-based gene networks for systems-level analysis of gene function in plants	<b>University of Arkansas,</b> Fayetteville, Arkansas, USA
2009	<b>M.Sc. Bioinformatics</b>	<b>Sardar Patel University, India</b>
2007	<b>B.Sc. Bioinformatics</b>	<b>Sardar Patel University, India</b>

### RESEARCH EXPERIENCE

2021 – present	<b>Postdoctoral Research Associate</b> <ul style="list-style-type: none"><li>• Neuropsychiatric disorders</li><li>• Single cell gene regulatory networks</li><li>• Heterogenous data integration</li></ul>	<b>University of Wisconsin,</b> Madison, Wisconsin, USA
2017 – 2020	<b>Postdoctoral Research Associate</b> <ul style="list-style-type: none"><li>• Rice environmental stress biology</li><li>• Network-based machine learning for gene prioritization</li><li>• Web applications (GRAiN)</li></ul>	<b>University of Arkansas,</b> Fayetteville, Arkansas, USA
2012 – 2017	<b>Graduate Research Assistant</b> <ul style="list-style-type: none"><li>• Plant stress and developmental biology</li><li>• Transcriptomics</li><li>• Gene coexpression networks</li><li>• Web applications (RECoN, SANE)</li></ul>	<b>University of Arkansas,</b> Fayetteville, Arkansas, USA
2008 — 2009	<b>Student Researcher</b> <ul style="list-style-type: none"><li>• Fusion proteins in cancer</li><li>• Protein structure prediction</li><li>• Molecular modeling, drug designing</li></ul>	<b>Disha Life Sciences Pvt. Ltd.,</b> Gujarat, India

## PUBLICATIONS

### *Under review/preprints*

1. **Chirag Gupta**, Arjun Krishnan, Andrew Schneider, Cynthia Denbow, Eva Collakova, Pawel Wolinski, Andy Pereira. SANE: The Seed Active Network for Discovering Transcriptional Regulatory Programs of Seed Development. bioRxiv, doi: 10.1101/165894 (in revision)

### *In preparation*

1. Applications of artificial intelligence and machine learning to multimodal data in intellectual and developmental disabilities (*review; 2022*)
2. Network analysis of primary and secondary cell types of the human brain. (*in preparation*)

### *Peer reviewed journal articles*

1. **Chirag Gupta**, Venkategowda Ramegowda, Supratim Basu, Andy Pereira. Using network-based machine learning to predict transcription factors involved in drought stress resistance. (*accepted, Front. in genetics, 2021*)
2. Raksha Singh, Rohana Liyanage, **Chirag Gupta**, Jackson Lay Jr., Andy Pereira, Clemencia Rojas. The protein interactomes of AtNHR2A and AtNHR2B unraveled common and specialized functions in plant immunity integrating distinct biological processes. **Frontiers in Plant Science**, March 2020. doi: 10.3389/fpls.2020.00232.
3. Min Woo Lee, Carmen S. Padilla, **Chirag Gupta**, Aravind Galla, Andy Pereira, Jiamei Li, Fiona L. Goggin. The FATTY ACID DESATURASE 2 family in tomato contributes to primary metabolism and stress responses. **Plant Physiology**, Nov. 2019. doi:10.1104/pp.19.00487.
4. **Chirag Gupta** and Andy Pereira. Recent advances in gene function prediction using context-specific coexpression networks in plants. **F1000Research**, Feb. 2019. doi: 10.12688/f1000research.17207.1.
5. Arjun Krishnan, **Chirag Gupta**, Madana MR Ambavaram, Andy Pereira. RECoN: Rice Environment Co-expression Network for systems level analysis of abiotic-stress response. **Frontiers in Plant Science**, Sep. 2017. doi: 10.3389/fpls.2017.01640
6. Venkategowda Ramegowda, Upinder Singh Gill, Palaiyur Nanjappan Sivalingam, Aarti Gupta, **Chirag Gupta**, Geetha Govind, Karaba N Nataraja, Andy Pereira, Makarla Udayakumar, Kirankumar S Mysore, Muthappa Senthil-Kumar. GBF3 transcription factor imparts drought tolerance in Arabidopsis thaliana. **Scientific Reports**, August 2017. doi: 10.1038/s41598-017-09542-1.
7. Venkategowda Ramegowda, Supratim Basu, **Chirag Gupta**, Andy Pereira. Regulation of grain yield in rice under well-watered and drought stress conditions by GUDK. **Plant Signaling and Behavior**, January 2015. doi: 10.1080/15592324.2015.1034421.

### *Published project reports*

1. Anuj Kumar, Sara Yingling, Julie Thomas, Charles Ruiz, Yheni Dwiningsih, **Chirag Gupta**, Paul Counce, T.J. Siebenmorgen, Karen A.K. Moldenhauer, Andy Pereira. Screening of Indica and Japonica rice subspecies for grain yield and quality under high nighttime temperature. **B.R. Wells Arkansas Rice Research Studies** 2018, 659:61-66.

2. Ramegowda Venkategowda, Subodh Srivastava, Julie Thomas, **Chirag Gupta**, Supratim Basu, Paul Counce, Ya-Jane Wang, Terry Siebenmorgen, Karen Moldenhauer, Andy Pereira. Genetic basis of altered grain quality in different rice cultivars under high nighttime temperature. **B.R. Wells Arkansas Rice Research Studies 2015**, 634:79-85.

## CONFERENCE PRESENTATIONS

### Talks

- Predicting rice genes important for drought tolerance using gene regulatory networks and machine learning. **Crops InSilico, 4th Annual Symposium and Hackathon**, Urbana, IL, 3rd May 2019
- Arabidopsis seed-filling association-network analysis. **American Society of Plant Biologists – Southern Section (ASPB-SS)**, Lexington, KY, 30th March 2014.

### Select posters

- Network-based approach to prioritize lung cancer genes from whole-exome sequencing data. **AR-BIC**, Little Rock, AR, 25th March 2018
- Differential Co-expression: A new paradigm for identification of candidate genes from expression data. **AR-BIC**, Little Rock, AR, 24th April 2017
- An abiotic-stress conditioned gene regulatory network in rice predicted using an ensemble of reverse-engineering solutions. **The 25th Plant and Animal Genome (PAG) Conference**, San Diego, CA, 14th January 2017
- A resource for systems analysis of stress response in rice. **NSF Workshop on plant development and drought stress**, Monterey, CA, 8th November 2015
- StarchNet: Implications of high night-time temperature on starch metabolism regulatory networks in rice. **AR NSF EPSCoR Annual Meeting**, Fayetteville, AR, 15th September 2015
- In Silico Analysis of Fusion Proteins in Cancer, **International Conference on Biomedical and Genomic Research**, Ahmedabad, India, 30th January 2009

## AWARDS

1. Crops in silico underrepresented minority travel scholarship, **Crops InSilico**, Urbana, IL, 2019
2. Scherago International Student Travel Grants Awards, **The 25th annual Plant and Animal Genome (PAG) meeting**, San Diego, CA, 2017
3. NSF Travel Grant to attend the Workshop on Plant Development and Drought Stress, **National Science Foundation**, 2015
4. Stood 3rd in merit list for all India entrance examination for Master's in bioinformatics program, **Sardar Patel University**, India, 2007
5. 2nd Prize in undergraduate oral presentation, **Sardar Patel University**, India, 2006
6. 3rd Prize in undergraduate poster competition, **Atmiya University**, India, 2006

## GRANT CONTRIBUTIONS

- **NSF EPSCoR RII Track-2 FEC 1826836**: Systems genetics studies on rice genomes for analysis of grain yield and quality under heat stress (PI: Dr. Andy Pereira; \$4,659,406), 2018
- **NSF MCB 1716844**: Systems genetics analysis of photosynthetic carbon metabolism in rice (PI: Dr. Andy Pereira; \$798,725.00), 2017

## SOCIETY MEMBERSHIPS

2019 - present      **The International Society for Computational Biology (ISCB)**

## SELECT SKILLS

<b>Programming</b>	R, Perl, PHP, MySQL
<b>Bioinformatics</b>	Docker, STAR, Tuxedo suite, BWA, Samtools, GATK, Picard, VarScan, Mutect, SomaticSniper, VCFtools, edgeR, DESeq, limma, LibSVM, Weka, BLAST, Arguslab, MolSoft, Rasmol, I-TASSER etc.
<b>Visualization</b>	R, CytoscapeWeb, D3.js
<b>Platforms</b>	UNIX, Linux, Google cloud, MacOS
<b>Version control</b>	Github

## TOOLS DEVELOPED

<b>GRAiNS</b>	<a href="http://rrn.uark.edu/shiny/apps/GRAiN/">http://rrn.uark.edu/shiny/apps/GRAiN/</a>
<b>SANe</b>	<a href="https://plantstress-pereira.uark.edu/SANe/">https://plantstress-pereira.uark.edu/SANe/</a>
<b>RECoN</b>	<a href="https://plantstress-pereira.uark.edu/RECoN/">https://plantstress-pereira.uark.edu/RECoN/</a>

## TEACHING EXPERIENCE

Co-taught Plant Genomics (**Bioinformatics/Genomics modules**: CSES 5543, Uni. Of Arkansas), 2016, 2018

## EXTENSION ACTIVITIES

Student and Teacher Workshop: rice genetic variation (18 credit hours, Uni. Of Arkansas), 2019

## ACADEMIC SERVICE

- **Manuscript reviewer** for Plant Physiology, Frontiers in Plant Science, Nature Scientific Reports, Rice, Plant Cell Reports, Horticultural Plant Journal, Plant Methods
- **Plante Fellow 2019**: Contribution to the Plantae online portal for Bioinformatics resources relevant to plant biology research
- **Member of the panel of judges** for the Northwest Arkansas Regional Science and Engineering Fair 2015,16
- Conducted several training material and hands-on activities for undergraduates and K-12 students from the Arkansas agricultural areas in the Delta region for a **STEM literacy outreach program**

## REFREES

Available upon request